



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name E-85; E-80; E-75
Version # 02
Issue date 04-23-2012
Revision date 01-10-2013
Supersedes date 11-13-2012
CAS # Mixture
MSDS Number 002A
Product use Refinery feedstock.
Synonym(s) Fuel ethanol.
See section 16 for complete information.
Manufacturer/Supplier Valero Marketing & Supply Company and Affiliates
P.O. Box 696000
San Antonio, TX 78269-6000
General Assistance 210-345-4593
Emergency 24 Hour Emergency 866-565-5220
1-800-424-9300 (CHEMTREC USA)

2. Hazards Identification

Physical state Liquid.
Appearance Colorless liquid.
Emergency overview DANGER!
Extremely flammable liquid and vapor - vapor may cause flash fire. Will be easily ignited by heat, spark or flames. Heat may cause the containers to explode.

Harmful if inhaled, absorbed through skin, or swallowed. Aspiration may cause lung damage. Irritating to eyes, respiratory system and skin. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. Contains benzene. Cancer hazard - can cause cancer. Mutagen. May cause heritable genetic damage. May cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Static accumulating flammable materials can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite material and vapor may cause flash fire (or explosion).

OSHA regulatory status This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects

Routes of exposure Inhalation. Ingestion. Skin contact. Eye contact.
Eyes Contact may irritate or burn eyes. Eye contact may result in corneal injury.
Skin Harmful if absorbed through skin. Irritating to skin. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Inhalation Harmful if inhaled. Irritating to respiratory system. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. May cause breathing disorders and lung damage. May cause cancer by inhalation. Prolonged inhalation may be harmful.
Ingestion Harmful if swallowed. Ingestion may result in vomiting; aspiration (breathing) of vomitus into lungs must be avoided as even small quantities may result in aspiration pneumonitis. Irritating to mouth, throat, and stomach.

Target organs Blood. Eyes. Liver. Respiratory system. Skin. Kidneys. Central nervous system.

Chronic effects Cancer hazard. Contains material which may have reproductive toxicity, teratogenic or mutagenic effects. Liver injury may occur. Kidney injury may occur. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.

Specific methods

In the event of fire and/or explosion do not breathe fumes. Use water spray to cool unopened containers.

Hazardous combustion products

Carbon monoxide. Carbon Dioxide. Sulfur oxides. Nitrogen oxides (NOx). Hydrocarbons.

6. Accidental Release Measures

Personal precautions

Keep unnecessary personnel away. Local authorities should be advised if significant spills cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the MSDS for Personal Protective Equipment.

Environmental precautions

Gasoline may contain oxygenated blend products (Ethanol, etc.) that are soluble in water and therefore precautions should be taken to protect surface and groundwater sources from contamination. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Firefighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802. For highway or railways spills, contact Chemtrec at 1-800-424-9300.

Methods for containment

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.

Methods for cleaning up

Use non-sparking tools and explosion-proof equipment.

Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste.

Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.

Other information

Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling

Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Wear personal protective equipment. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is extremely flammable, and explosive vapor/air mixtures may be formed even at normal room temperatures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.

Storage

Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

Signs and symptoms

Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Cyanosis (blue tissue condition, nails, lips, and/or skin). Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash.

Potential environmental effects Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

| Components | CAS # | Percent |
|------------------------|------------|---------|
| Ethanol | 64-17-5 | 75-85 |
| Gasoline | 86290-81-5 | 15-25 |
| Toluene | 108-88-3 | < 5 |
| Xylene Isomers | 1330-20-7 | < 5 |
| 1,2,4-Trimethylbenzene | 95-63-6 | < 2 |
| Benzene | 71-43-2 | < 2 |
| Ethylbenzene | 100-41-4 | < 1 |

4. First Aid Measures**First aid procedures****Eye contact**

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.

Skin contact

Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion

Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Get medical attention immediately.

Notes to physician

In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General advice

If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire Fighting Measures**Flammable properties**

Flammable by OSHA criteria. Containers may explode when heated.

Extinguishing media**Suitable extinguishing media**

Water spray. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

Protection of firefighters**Specific hazards arising from the chemical**

Vapor may cause flash fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

Protective equipment and precautions for firefighters

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Vapors may form explosive air mixtures even at room temperature. Prevent buildup of vapors or gases to explosive concentrations. Some of these materials, if spilled, may evaporate leaving a flammable residue. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

| Components | Type | Value |
|---|------|----------|
| 1,2,4-Trimethylbenzene (CAS 95-63-6) | TWA | 25 ppm |
| Benzene (CAS 71-43-2) | STEL | 2.5 ppm |
| | TWA | 0.5 ppm |
| Ethanol (CAS 64-17-5) | STEL | 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | TWA | 20 ppm |
| Gasoline (CAS 86290-81-5) | STEL | 500 ppm |
| | TWA | 300 ppm |
| Toluene (CAS 108-88-3) | TWA | 20 ppm |
| Xylene Isomers (CAS 1330-20-7) | STEL | 150 ppm |
| | TWA | 100 ppm |

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

| Components | Type | Value |
|-----------------------|------|-------|
| Benzene (CAS 71-43-2) | STEL | 5 ppm |
| | TWA | 1 ppm |

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

| Components | Type | Value |
|-----------------------------------|------|------------------------|
| Ethanol (CAS 64-17-5) | PEL | 1900 mg/m3 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | PEL | 435 mg/m3 100 ppm |
| Xylene Isomers (CAS 1330-20-7) | PEL | 435 mg/m3 100 ppm |

US. OSHA Table Z-2 (29 CFR 1910.1000)

| Components | Type | Value |
|------------------------|---------|---------|
| Benzene (CAS 71-43-2) | Ceiling | 25 ppm |
| | TWA | 10 ppm |
| Toluene (CAS 108-88-3) | Ceiling | 300 ppm |
| | TWA | 200 ppm |

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

| Components | Type | Value |
|---|------|---------------------------------|
| 1,2,4-Trimethylbenzene (CAS 95-63-6) | TWA | 123 mg/m3 |
| Benzene (CAS 71-43-2) | STEL | 25 ppm 8 mg/m3 |
| | TWA | 2.5 ppm 1.6 mg/m3 0.5 ppm |
| Ethanol (CAS 64-17-5) | TWA | 1880 mg/m3 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | STEL | 543 mg/m3 |
| | TWA | 125 ppm 434 mg/m3 100 ppm |
| Gasoline (CAS 86290-81-5) | STEL | 500 ppm |
| | TWA | 300 ppm |
| Toluene (CAS 108-88-3) | TWA | 188 mg/m3 |

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Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

| Components | Type | Value |
|--------------------------------|------|---|
| Xylene Isomers (CAS 1330-20-7) | STEL | 50 ppm 651 mg/m ³ |
| | TWA | 150 ppm 434 mg/m ³ 100 ppm |

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

| Components | Type | Value |
|--------------------------------------|------|----------|
| 1,2,4-Trimethylbenzene (CAS 95-63-6) | TWA | 25 ppm |
| Benzene (CAS 71-43-2) | STEL | 2.5 ppm |
| | TWA | 0.5 ppm |
| Ethanol (CAS 64-17-5) | STEL | 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | TWA | 20 ppm |
| Gasoline (CAS 86290-81-5) | STEL | 500 ppm |
| | TWA | 300 ppm |
| Toluene (CAS 108-88-3) | TWA | 20 ppm |
| Xylene Isomers (CAS 1330-20-7) | STEL | 150 ppm |
| | TWA | 100 ppm |

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

| Components | Type | Value |
|--------------------------------------|------|----------|
| 1,2,4-Trimethylbenzene (CAS 95-63-6) | TWA | 25 ppm |
| Benzene (CAS 71-43-2) | STEL | 2.5 ppm |
| | TWA | 0.5 ppm |
| Ethanol (CAS 64-17-5) | STEL | 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | STEL | 125 ppm |
| | TWA | 100 ppm |
| Gasoline (CAS 86290-81-5) | STEL | 500 ppm |
| | TWA | 300 ppm |
| Toluene (CAS 108-88-3) | TWA | 20 ppm |
| Xylene Isomers (CAS 1330-20-7) | STEL | 150 ppm |
| | TWA | 100 ppm |

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

| Components | Type | Value |
|--------------------------------------|------|---|
| 1,2,4-Trimethylbenzene (CAS 95-63-6) | TWA | 123 mg/m ³ |
| Benzene (CAS 71-43-2) | STEL | 25 ppm 15.5 mg/m ³ |
| | TWA | 5 ppm 3 mg/m ³ 1 ppm |
| | TWA | 1880 mg/m ³ 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | STEL | 543 mg/m ³ |
| | TWA | 125 ppm 434 mg/m ³ 100 ppm |
| Toluene (CAS 108-88-3) | TWA | 188 mg/m ³ 50 ppm |

Canada, Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

| Components | Type | Value |
|--------------------------------|------|----------------------------------|
| Xylene Isomers (CAS 1330-20-7) | STEL | 651 mg/m ³ |
| | | 150 ppm |
| | TWA | 434 mg/m ³ 100 ppm |

Mexico. Occupational Exposure Limit Values

| Components | Type | Value |
|--------------------------------------|------|----------------------------------|
| 1,2,4-Trimethylbenzene (CAS 95-63-6) | STEL | 170 mg/m ³ |
| | TWA | 35 ppm 125 mg/m ³ |
| Benzene (CAS 71-43-2) | STEL | 25 ppm 16 mg/m ³ |
| | TWA | 5 ppm 3.2 mg/m ³ |
| Ethanol (CAS 64-17-5) | TWA | 1 ppm 1900 mg/m ³ |
| | | 1000 ppm |
| Ethylbenzene (CAS 100-41-4) | STEL | 545 mg/m ³ |
| | TWA | 125 ppm 435 mg/m ³ |
| Toluene (CAS 108-88-3) | TWA | 100 ppm 188 mg/m ³ |
| | | 50 ppm |
| Xylene Isomers (CAS 1330-20-7) | STEL | 655 mg/m ³ |
| | TWA | 150 ppm 435 mg/m ³ |
| | | 100 ppm |

Engineering controls Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Personal protective equipment

Eye / face protection Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection Wear chemical-resistant, impervious gloves. Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

Respiratory protection Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use.

General hygiene considerations Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

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|-----------------------|-------------------|
| Appearance | Colorless liquid. |
| Physical state | Liquid. |
| Form | Liquid. |
| Color | Colorless |

| | |
|--|--|
| Odor | Characteristic Gasoline Odor (Strong). |
| Odor threshold | Not available. |
| pH | Not available. |
| Vapor pressure | 45 mm Hg (Ethanol) |
| Vapor density | 1.6 |
| Boiling point | 158 °F (70 °C) (Ethanol) |
| Melting point/Freezing point | -173 °F (-113.9 °C) (Ethanol) |
| Solubility (water) | 100 % (Ethanol) |
| Specific gravity | 0.785 |
| Flash point | 55 °F (12.8 °C) (Ethanol) |
| Flammability limits in air, upper, % by volume | 19 % v/v (Ethanol) |
| Flammability limits in air, lower, % by volume | 3.3 % v/v (Ethanol) |
| Auto-ignition temperature | 685 °F (362.78 °C) (Ethanol) |
| VOC | 100 % |
| Evaporation rate | > 1 |
| Partition coefficient (n-octanol/water) | No data available. |

Other data

Flash point class Flammable IA

10. Chemical Stability & Reactivity Information

| | |
|------------------------------------|--|
| Chemical stability | Stable under normal temperature conditions and recommended use. |
| Conditions to avoid | Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. |
| Incompatible materials | Strong oxidizing agents. Strong acids. Alkalis. |
| Hazardous decomposition products | Carbon oxides. Sulfur oxides. Nitrogen oxides (NOx). Hydrocarbons. |
| Possibility of hazardous reactions | Hazardous polymerization does not occur. |

11. Toxicological Information

Toxicological data

| Components | Species | Test Results |
|-----------------------------|---------|--------------------|
| Ethanol (CAS 64-17-5) | | |
| Acute | | |
| Inhalation | | |
| LC50 | Rat | 30000 mg/m3 |
| Oral | | |
| LD50 | Rat | 11.5 g/kg |
| Ethylbenzene (CAS 100-41-4) | | |
| Acute | | |
| Dermal | | |
| LD50 | Rabbit | > 5000 mg/kg |
| Oral | | |
| LD50 | Rat | 5.46 g/kg |
| Toluene (CAS 108-88-3) | | |
| Acute | | |
| Inhalation | | |
| LC50 | Rat | 8000 mg/l, 4 Hours |

| Components | Species | Test Results |
|---|---|--------------|
| Oral LC50 Xylene Isomers (CAS 1330-20-7) | Rat | 636 mg/kg |
| Acute Oral LD50 | Rat | 4300 mg/kg |
| Sensitization | This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals. | |
| Acute effects | Harmful if inhaled, absorbed through skin, or swallowed. Harmful: may cause lung damage if swallowed. Irritating to eyes, respiratory system and skin. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. | |
| Local effects | | |
| US. ACGIH Threshold Limit Values | | |
| Benzene (CAS 71-43-2) | Can be absorbed through the skin. | |
| Chronic effects | Repeated exposure of laboratory animals to high concentrations of gasoline vapors has caused kidney damage and cancer in rats and cancer in mice. Gasoline was evaluated for genetic activity in assays using microbial cells, cultured mammalian cells and rat bone marrow cells. The results were all negative so gasoline was considered nonmutagenic under these conditions. Overexposure to this product or its components has been suggested as a cause of liver abnormalities in laboratory animals and humans. Lifetime studies by the American Petroleum Institute have shown that kidney damage and kidney cancer can occur in male rats after prolonged inhalation exposures at elevated concentrations of total gasoline. Kidneys of mice and female rats were unaffected. The U.S. EPA Risk Assessment Forum has concluded that the male rat kidney tumor results are not relevant for humans. Total gasoline exposure also produced liver tumors in female mice only. The implication of these data for humans has not been determined. | |
| Subchronic effects | Subchronic inhalation of benzene by rats produced decreased white blood cell counts, decreased bone marrow cell activity, increased red blood cell activity and cataracts. Blood disorders may occur after prolonged inhalation, prolonged skin contact and/or ingestion. Liver and kidney damage may occur after prolonged and repeated exposure. | |
| Carcinogenicity | | |
| ACGIH Carcinogens | | |
| Benzene (CAS 71-43-2) | A1 Confirmed human carcinogen. | |
| Ethanol (CAS 64-17-5) | A3 Confirmed animal carcinogen with unknown relevance to humans. | |
| Ethylbenzene (CAS 100-41-4) | A3 Confirmed animal carcinogen with unknown relevance to humans. | |
| Gasoline (CAS 86290-81-5) | A3 Confirmed animal carcinogen with unknown relevance to humans. | |
| Toluene (CAS 108-88-3) | A4 Not classifiable as a human carcinogen. | |
| Xylene Isomers (CAS 1330-20-7) | A4 Not classifiable as a human carcinogen. | |
| IARC Monographs. Overall Evaluation of Carcinogenicity | | |
| Benzene (CAS 71-43-2) | 1 Carcinogenic to humans. | |
| Ethylbenzene (CAS 100-41-4) | 2B Possibly carcinogenic to humans. | |
| Gasoline (CAS 86290-81-5) | 2B Possibly carcinogenic to humans. | |
| Toluene (CAS 108-88-3) | 3 Not classifiable as to carcinogenicity to humans. | |
| Xylene Isomers (CAS 1330-20-7) | 3 Not classifiable as to carcinogenicity to humans. | |
| US NTP Report on Carcinogens: Known carcinogen | | |
| Benzene (CAS 71-43-2) | Known To Be Human Carcinogen. | |
| US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) | | |
| Benzene (CAS 71-43-2) | Cancer hazard. | |
| Epidemiology | Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established. Studies have shown a risk of spontaneous abortions in women exposed to high concentrations of organic solvents during pregnancy. | |

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|-----------------------------|---|
| Mutagenicity | In in-vitro experiments, neither benzene, toluene nor xylene changed the number of sister-chromatid exchanges (SCEs) or the number of chromosomal aberrations in human lymphocytes. However, toluene and xylene caused a significant cell growth inhibition which was not observed with benzene in the same concentrations. In in-vivo experiments, toluene changed the number of sister-chromatid exchanges (SCEs) in human lymphocytes. Toluene may cause heritable genetic damage. |
| Neurological effects | Chronic exposure to high concentrations of various hydrocarbon blends may lead to polyneuropathy (peripheral nerve damage), characterized by progressive weakness and numbness in the extremities, loss of deep tendon reflexes and reduction of motor nerve conduction velocity. Numerous cases of polyneuritis have been reported following prolonged exposures to a petroleum fraction containing various isomers of heptane as major ingredients. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue) and/or damage. |
| Reproductive effects | Benzene, xylene and toluene have demonstrated animal effects of reproductive toxicity. Animal studies of benzene have shown testicular effects, alterations in reproductive cycles, chromosomal aberrations and embryo/fetotoxicity. Ethanol has demonstrated human effects of reproductive toxicity. May damage fertility or the unborn child. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. Avoid exposure to women during early pregnancy. Avoid contact during pregnancy/while nursing. |
| Teratogenicity | Abusive inhalation of toluene ("glue sniffing") has been reported to be associated with birth defects in the offspring of abusers. Rats exposed to benzene and xylene vapor during pregnancy showed embryo/fetotoxic effects. Ethanol has demonstrated human effects of teratogenicity. |
| Further information | Symptoms may be delayed. |

12. Ecological Information

Ecotoxicological data

| Components | | Species | Test Results |
|--------------------------------|--|--|----------------------------|
| Benzene (CAS 71-43-2) | | | |
| Aquatic | | | |
| Crustacea | EC50 | Water flea (Daphnia magna) | 8.76 - 15.6 mg/l, 48 hours |
| Fish | LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) | 5.3 mg/l, 96 hours |
| Ethanol (CAS 64-17-5) | | | |
| Aquatic | | | |
| Algae | EC50 | Freshwater algae | 275 mg/l, 72 Hours |
| | | Marine water algae | 1970 mg/l |
| Fish | LC50 | Fathead minnow (Pimephales promelas) | > 100 mg/l, 96 hours |
| | | Freshwater fish | 11200 mg/l, 96 Hours |
| Invertebrate | EC50 | Freshwater invertebrate | 5012 mg/l, 48 Hours |
| | | Marine water invertebrate | 857 mg/l, 48 Hours |
| Ethylbenzene (CAS 100-41-4) | | | |
| Aquatic | | | |
| Crustacea | EC50 | Water flea (Daphnia magna) | 1 - 4 mg/l, 48 hours |
| Fish | LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) | 4 mg/l, 96 hours |
| Toluene (CAS 108-88-3) | | | |
| Aquatic | | | |
| Crustacea | EC50 | Water flea (Daphnia magna) | 5.46 - 9.83 mg/l, 48 hours |
| Fish | LC50 | Coho salmon, silver salmon (Oncorhynchus kisutch) | 5.5 mg/l, 96 hours |
| Xylene Isomers (CAS 1330-20-7) | | | |
| Aquatic | | | |
| Fish | LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) | 8 mg/l, 96 Hours |
| Ecotoxicity | Not expected to be harmful to aquatic organisms. | | |

| | | |
|---------------------------------------|--|-------|
| Persistence and degradability | When spilled on land denatured ethanol is apt to volatilize, biodegrade and/or leach into the ground. It is anticipated that ethyl alcohol will neither adsorb to soil nor bioconcentrate in aquatic organisms. In water photolysis, oxidation, hydrolysis and biodegradation are expected to occur. | |
| Bioaccumulation / Accumulation | The product is not expected to bioaccumulate. | |
| Partition coefficient | No data available. | |
| Ethanol (CAS 64-17-5) | | -0.31 |
| Benzene (CAS 71-43-2) | | 2.13 |
| Toluene (CAS 108-88-3) | | 2.73 |
| Ethylbenzene (CAS 100-41-4) | | 3.15 |
| Xylene Isomers (CAS 1330-20-7) | | 3.2 |

13. Disposal Considerations

| | |
|------------------------------|---|
| Waste codes | D001: Waste Flammable material with a flash point <140 °F |
| Disposal instructions | Dispose in accordance with all applicable regulations. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. |

14. Transport Information

DOT

| | |
|-------------------------------------|------------------------------|
| Basic shipping requirements: | |
| UN number | UN3475 |
| Proper shipping name | Ethanol and gasoline mixture |
| Hazard class | 3 |
| Packing group | II |
| Additional information: | |
| Special provisions | 144, 177, IB2, T4, TP1 |
| Packaging exceptions | 150 |
| Packaging non bulk | 202 |
| Packaging bulk | 242 |

IATA

| | |
|----------------------------|------------------------------|
| UN number | UN3475 |
| UN proper shipping name | Ethanol and gasoline mixture |
| Transport hazard class(es) | 3 |
| Packing group | II |
| ERG code | 3L |

IMDG

| | |
|----------------------------|------------------------------|
| UN number | UN3475 |
| UN proper shipping name | ETHANOL AND GASOLINE MIXTURE |
| Transport hazard class(es) | 3 |
| Packing group | II |
| Ems | F-E, S-E |

TDG

| | |
|----------------------|----------------------------|
| Proper shipping name | ETHANOL AND PETROL MIXTURE |
| Hazard class | 3 |
| UN number | UN3475 |
| Packing group | II |

15. Regulatory Information

| | |
|-------------------------------|---|
| US federal regulations | This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List. |
|-------------------------------|---|

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzene (CAS 71-43-2)
Ethylbenzene (CAS 100-41-4)
Toluene (CAS 108-88-3)

Xylene Isomers (CAS 1330-20-7)

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

| | |
|--------------------------------|-------|
| Benzene (CAS 71-43-2) | 0.1 % |
| Ethylbenzene (CAS 100-41-4) | 0.1 % |
| Toluene (CAS 108-88-3) | 1.0 % |
| Xylene Isomers (CAS 1330-20-7) | 1.0 % |

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

| | |
|--------------------------------|---------|
| Benzene (CAS 71-43-2) | Listed. |
| Ethylbenzene (CAS 100-41-4) | Listed. |
| Toluene (CAS 108-88-3) | Listed. |
| Xylene Isomers (CAS 1330-20-7) | Listed. |

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

Gasoline: 100
Toluene: 1000
Xylene Isomers: 100
Benzene: 10
Ethylbenzene: 1000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance (40 CFR 355, Appendix A)
No

Section 311/312 (40 CFR 370)
Yes

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15)
Not controlled

Canadian regulations
This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status
Controlled

WHMIS classification
B2 - Flammable Liquids
D2A - Other Toxic Effects-VERY TOXIC
D2B - Other Toxic Effects-TOXIC

WHMIS labeling



Inventory status

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|-----------------------------|--|------------------------|
| Australia | Australian Inventory of Chemical Substances (AICS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | No |
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | Yes |
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | No |

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

State regulations

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

| | |
|--------------------------------|---------|
| Benzene (CAS 71-43-2) | Listed. |
| Ethanol (CAS 64-17-5) | Listed. |
| Ethylbenzene (CAS 100-41-4) | Listed. |
| Toluene (CAS 108-88-3) | Listed. |
| Xylene Isomers (CAS 1330-20-7) | Listed. |

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

| | |
|-----------------------------|---------|
| Benzene (CAS 71-43-2) | Listed. |
| Ethylbenzene (CAS 100-41-4) | Listed. |
| Toluene (CAS 108-88-3) | Listed. |

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

| | |
|-----------------------------|---|
| Benzene (CAS 71-43-2) | Listed: February 27, 1987 Carcinogenic. |
| Ethylbenzene (CAS 100-41-4) | Listed: June 11, 2004 Carcinogenic. |

US - California Proposition 65 - CRT: Listed date/Developmental toxin

| | |
|------------------------|--|
| Benzene (CAS 71-43-2) | Listed: December 26, 1997 Developmental toxin. |
| Toluene (CAS 108-88-3) | Listed: January 1, 1991 Developmental toxin. |

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

| | |
|------------------------|---|
| Toluene (CAS 108-88-3) | Listed: August 7, 2009 Female reproductive toxin. |
|------------------------|---|

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

| | |
|-----------------------|--|
| Benzene (CAS 71-43-2) | Listed: December 26, 1997 Male reproductive toxin. |
|-----------------------|--|

US - New Jersey RTK - Substances: Listed substance

| | |
|--------------------------------|---------|
| Benzene (CAS 71-43-2) | Listed. |
| Ethanol (CAS 64-17-5) | Listed. |
| Ethylbenzene (CAS 100-41-4) | Listed. |
| Toluene (CAS 108-88-3) | Listed. |
| Xylene Isomers (CAS 1330-20-7) | Listed. |

US - Pennsylvania RTK - Hazardous Substances: Special hazard

| | |
|-----------------------|-----------------|
| Benzene (CAS 71-43-2) | Special hazard. |
|-----------------------|-----------------|

US. Massachusetts RTK - Substance List

| | |
|--------------------------------|---------|
| Benzene (CAS 71-43-2) | Listed. |
| Ethanol (CAS 64-17-5) | Listed. |
| Ethylbenzene (CAS 100-41-4) | Listed. |
| Toluene (CAS 108-88-3) | Listed. |
| Xylene Isomers (CAS 1330-20-7) | Listed. |

US. New Jersey Worker and Community Right-to-Know Act

| | |
|--------------------------------|---------|
| Benzene (CAS 71-43-2) | 500 LBS |
| Ethylbenzene (CAS 100-41-4) | 500 LBS |
| Toluene (CAS 108-88-3) | 500 LBS |
| Xylene Isomers (CAS 1330-20-7) | 500 LBS |

US. Pennsylvania RTK - Hazardous Substances

| | |
|--------------------------------|---------|
| Benzene (CAS 71-43-2) | Listed. |
| Ethanol (CAS 64-17-5) | Listed. |
| Ethylbenzene (CAS 100-41-4) | Listed. |
| Gasoline (CAS 86290-81-5) | Listed. |
| Toluene (CAS 108-88-3) | Listed. |
| Xylene Isomers (CAS 1330-20-7) | Listed. |

16. Other Information**Further information**

HMIS® is a registered trade and service mark of the NPCA.

Other information

Note: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical Specifications vary greatly depending on the products and are not reflected in this document. Consult specification sheets for technical information.

HMIS® ratings

Health: 2*
Flammability: 3
Physical hazard: 0

NFPA ratings

Health: 2
Flammability: 3
Instability: 0

Disclaimer

This Material Safety Data Sheet (MSDS) was prepared in accordance with 29 CFR 1910.1200 by Valero Marketing & Supply Co., ("VALERO"). VALERO does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this MSDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use, the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.



CENEX, Inc.

P.O. Box 64089

St. Paul, Minnesota 55164-0089

Phone (612) 451-5151

DATE DEC 1994

MATERIAL SAFETY DATA SHEET

SECTION I

DISTRIBUTORS NAME: CENEX, INC.
ADDRESS: PO BOX 64089, ST PAUL MN 55164-0089
TELEPHONE NO: (612) 451-5151
EMERGENCY TELEPHONE: (800) 424-9300 (CHEMTREC)
CHEMICAL NAME & SYNONYMS: ETHANOL, ETHYL ALCOHOL
TRADE NAME & SYNONYMS: FUEL ETHANOL

SECTION II INGREDIENTS & HAZARDS

This material is hazardous as defined by OSHA's Hazard Communication Standard 29 CFR 1910.1200.

| | <u>CONCENTRATION %</u> | <u>C.A.S. NUMBER</u> |
|--------------------------------|------------------------|----------------------|
| Hazardous Ingredients: | | |
| Ethanol | 95 | 64-17-5 |
| Gasoline (Unleaded) | 5 | 8006-61-9 |
| Hazardous Physical Properties: | | |
| Flammable Liquid | | |

SECTION III PHYSICAL DATA

Boiling Point (F.): 173 Typical (Ethanol)

Vapor Pressure @ 68 F. (mmHg): 45

Solubility In Water: Complete

Specific Gravity: 0.79

Percent Volatile: 100
(By Volume %)

Vapor Density (Air=1): >1

Appearance & Odor: Clear mobile liquid; characteristic alcohol odor.

sol.
odor
...

SECTION IV FIRE & EXPLOSION DATA

Flash Point (F.): Below -5

Autoignition Temp (F.): Not Determined

Flammability Limits: LEL 3.3%
UEL 19.0%

Extinguishing Media: CO2, dry chemical, foam, water spray.

Special Fire Fighting Procedures: Water is not effective until the alcohol contains approximately 80% or more water.

Unusual Fire & Explosion Hazards: Flammable liquid. Vapors are heavier than air and may travel some distance to an ignition source and flash back.

NFPA Rating: Health 1 Fire 3 Reactivity 0

SECTION V HEALTH HAZARD DATA

Primary Route(s) of Exposure/Entry: Inhalation, Skin

TLV-TWA: 1000 ppm (Ethanol) ACGIH

PEL: 1900 mg/m3 (Ethanol) OSHA, 300 ppm (Gasoline) OSHA

Not for human consumption (contains gasoline). Harmful or fatal if swallowed! Harmful vapors. Can cause lung damage. May cause eye and skin irritation. Extremely flammable!

Eye irritation potential has not been determined. It could cause prolonged vision impairment. Prolonged or frequent contact may cause skin irritation. May include pain, discoloration, swelling, and blistering. However, it is considered practically non-toxic to internal organs via skin contact. This alcohol product is denatured and therefore not fit for consumption. Ingestion can cause loss of co-ordination, loss of appetite, headache, dizziness, and loss of consciousness. Breathing vapors at concentrations above exposure limits can cause CNS effects including dizziness, weakness, headache, loss of appetite and co-ordination.

This material is not listed as a carcinogen by the NTP, IARC or OSHA. However, this product contains benzene which is listed as a carcinogen by the NTP and OSHA.

SECTION VI EMERGENCY & FIRST AID INFORMATION

EYE CONTACT: Immediately flush with water for 15 minutes while holding open eyelids. If irritation develops, contact a physician.

SKIN CONTACT: Remove contaminated clothing. Wash skin with soap and warm water. If irritation develops, contact a physician.

INHALATION: Move victim to fresh air. Contact a physician. If breathing has stopped, start artificial respiration.

INGESTION: Give two glasses of milk or water to dilute if conscious. Never give anything by mouth to an unconscious person. Contact poison control center or physician. Do not induce vomiting unless instructed to do so.

SECTION VII REACTIVITY DATA

This is a stable material in closed containers under normal storage and handling conditions. It does not undergo hazardous polymerization.

Material is incompatible with strong oxidizers, strong acids and bases.

SECTION VIII SPILL OR LEAK PROCEDURES

Immediately remove all sources of ignition. Provide maximum natural and/or mechanical explosion-proof ventilation. Wear all appropriate personnel protective equipment. Dike ahead of flow with inert material (sand, earth, clay, floor dry, etc.) to contain material. Transfer liquid and diking material to separate containers for disposal using explosion-proof/non-sparking tools. Stop release if it can be done without undue risk. Report spills to appropriate local, state, and federal authorities. Follow all applicable disposal regulations.

SECTION IX SPECIAL PROTECTION INFORMATION

Danger! FLAMMABLE LIQUID! Provide ventilation and eliminate ignition sources in use area. The use of safety goggles or face shield is recommended where splashing is a possibility. Use body-covering work clothing, apron, and rubber gloves to minimize skin contact. Additional ventilation or exhaust may be required to meet TLV air concentrations. Use explosion-proof equipment. If air concentrations exceed exposure limits, use NIOSH approved supplied air respirator. A source of clean water should be available in the work area for flushing eyes and skin.

SECTION X TRANSPORTATION, STORAGE, SPECIAL PRECAUTIONS & COMMENTS

Storage Information: Store separate from oxidizing agents, storing acids and bases in a cool, dry, well ventilated area away from heat, direct sunlight, and all sources of ignition. Post area NO SMOKING OR OPEN FLAME. Keep containers closed. Bond and ground all equipment when transferring from one vessel to another to prevent static charge. The use of explosion proof equipment may be required (check fire codes). Protect containers from physical damage. Outdoor or detached storage is preferred. Indoor storage must meet OSHA standards and fire codes. Do not enter confined spaces without following proper entry procedures. Empty containers retain residue and may exhibit hazards of the material. Do not pressurize, cut, weld, solder, drill, grind or expose such containers to any ignition source. Empty drums should be completely drained, bunged and shipped to the supplier or drum reconditioner.

Proper Shipping Name: Flammable Liquid, N.O.S. (contains ethyl alcohol, gasoline)

Hazard Class: 3

UN/NA No: UN 1993

PG: II

DOT Label: Flammable Liquid

DOT Placard: Flammable

SECTION XI REGULATORY INFORMATION, (NOT ALL INCLUSIVE)

SARA Title III Sections 302, 304, 311, 312, 313.
 Section 302/304-Extremely Hazardous Substances (40 CFR 355) this material is not known to contain greater than 1.0% of any extremely hazardous substance. Section 311/312 MSDS and OSHA's Hazard Communication Standard (40 CFR 370). Under OSHA's Hazard Communication Standard (29 CFR 1910.1200) this product should be reported under the following EPA hazard categories:

- Acute (immediate) Health Hazard
- Chronic (delayed) Health Hazard
- Fire
- Sudden Release of Pressure
- Reactive
- Not Applicable

Section 313 Toxic Chemical Components (40 CFR 372). This product contains the following chemicals at a concentration of 1.0% or greater if hazardous (0.1% or greater for carcinogens) identified as toxic and is subject to toxic chemical release reporting requirements.

| <u>Component</u> | <u>C.A.S. No</u> | <u>Approx Percent</u> |
|------------------|------------------|-----------------------|
| Benzene | 71-43-2 | 0.25 |

The chemical ingredients in this material are on the U.S. Toxic Substance Control Act inventory and/or otherwise are in compliance with TSCA.

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the result to be obtained from the use thereof. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.